the practice of medicine, the prescribing of dosages of dangerous drugs, the diagnosing of the condition and cause of reactions, and the use of the right remedy for treating the condition arising, to the licensed practitioner.

❀

JOHN MILLER WILSON, M. D. (605 Professional Building, Pasadena).—Doctor Wineland's description of the therapeutic action of carbon dioxid explains why we get results when we use it. His explanation of the gravity method which he is using and recommending looks plausible and should be a very satisfactory way of administration to adults.

My use of carbon dioxid has been limited to pneumonias and other lung conditions, and in anesthesia, especially in lung and chest surgery by the tent or mask methods, using the 5 per cent carbon dioxid in oxygen mixture known as the so-called carbogen.

In cesarean operations the use of carbogen for a few breaths just before the incision into the uterus, and after the delivery before the cord is cut, makes it easy for the operator to deliver a pink baby, which should cry before it leaves the surgeon's hands.

As Doctor Wineland has stated, the dose of carbon dioxid should be small at first, and gradually increased as the need of the individual patient requires.

PRIMARY CARCINOMA OF THE URETER*

By CHARLES PIERRE MATHÉ, M. D.
AND
EMILIO DE LA PEÑA, M. D.
San Francisco

DISCUSSION *by Paul A. Ferrier, M.D., Pasadena; J. C. Negley, M.D., Los Angeles.*

PRIMARY carcinoma of the ureter is a rare and obscure condition which offers difficulty in diagnosis. Its symptomatology is not always characteristic, and a goodly number of the reported cases were discovered either accidentally or at the autopsy table. Yet its early detection is a very worth while objective, as it offers the only chance for successful surgical relief, since these tumors have very early and widespread metastases. On account of its rarity, it is still well to report proved cases such as ours with the object of calling the profession's attention to its possibility, when an obstructive lesion of the ureter is encountered in a patient presenting the signs and symptoms of cancer, and in which stone formation and stricture can be reasonably ruled out. With this object in mind, we report a case diagnosed by modern urological methods, proved by operation and verified by autopsy. Recently the etiology, symptomatology, diagnosis, and treatment, including the end-results of primary carcinoma of the ureter, have been well covered by the numerous excellent monographs on the subject. Player [1] collected thirty-nine cases in 1928, Stampinato [2] eighty-nine cases in 1932, and Snyder and Wood [3] sixty-nine cases in 1933. Recently, in February, 1934, Scott [4] has reviewed the clinical course and results in forty-four cases treated by operation. A very complete review is that of Chauvin and Cerati,[5] who collected some 112 cases of malignant and benign primary tumors of the ureter reported up to 1932. The object of this paper is to add a proved case of primary carcinoma of the ureter to the literature, and to point out certain diagnostic points that will enhance its early detection, at which time the correct surgical treatment is most likely to give permanent relief.

REPORT OF CASE

Rev. J. B., Catholic priest, age 43, entered St. Mary's Hospital on June 12, 1933, having been referred from San Luis Obispo, because of left-sided renal colic, pain and swelling in the region of the left kidney and microscopic hematuria. For the past six years he had suffered several attacks of mild lumbar pain in the left lumbar region, radiating anteriorly to the lower abdominal quadrant and usually lasting a few days. Two months prior to his entry into the hospital, he experienced a severe attack of Dietl's crisis: sharp pain in the left lumbar region, which radiated anteriorly to the testis. The pain was so intense that an injection of an opiate was required before relief was obtained. The attack was accompanied by nausea and vomiting. There was no hematuria before, during or after the attack. Microscopical examination of the urine during this attack, however, revealed a large number of red-blood cells. Shortly afterward the patient became debilitated, the appetite poor, and he began to lose weight. He experienced no difficulty in urination.

Physical Examination. — General appearance, good. Heart and lungs, negative. Blood pressure: Systolic, 118; diastolic, 72. In the left upper abdominal quadrant a large, elongated, regular mass, corresponding to the left kidney, was palpated. It moved with respiration, and the overlying musculature in the upper abdominal quadrant and lumbar region presented some tenderness, but no rigidity.

Laboratory Examination.—Blood examination: Hemoglobin, 98 per cent; erythrocytes, 4,840,000; leukocytes, 12,050; polymorphonuclear leukocytes, 77 per cent; small mononuclear lymphocytes, 10 per cent; and large mononuclear lymphocytes, 13 per cent. Catheterized specimen of urine showed neither albumin nor sugar—a few mucous shreds, and an occasional leukocyte and erythrocyte. No neoplastic cells nor organisms were found. Phenolsulphonephthalein test: Seventy per cent recovered in two hours after intramuscular injection.

Cystoscopy, June 13, 1933, revealed no obstruction of the vesical outlet. There was injection of the trigone and bladder wall surrounding the left orifice. The ureteral spurt was absent on the left side. In passing the ureteral catheter up the left ureter, complete obstruction was encountered 11 centimeters from the orifice; and although the patient was placed in the extreme Trendelenburg position and various-shaped filiforms utilized, it was impossible to get by. A former attempt to pass by in San Luis Obispo had also been futile. Following the manipulations performed in an effort to pass by this obstruction, continual non-peristaltic bleeding came from the left orifice. Table 1 gives the kidney and bladder catheterized findings.

X-Ray Examination. — Roentgenological examination revealed a moderately enlarged left kidney, with no evidence of stone in either urinary tract. Retrograde pyelography revealed normal filling of the ureter to a point 11 centimeters from the left orifice. In this area a pressure defect was seen. Some of the iodid solution passed by an obstruction which had almost completely blocked the ureter at this point, filling the inferior calyx of the left kidney, which was found to

---

*From the Urological Department of Saint Mary's Hospital and the Southern Pacific General Hospital, San Francisco, California.

Read before the Urology Section of the California Medical Association at the sixty-third annual session, Riverside, April 30 to May 3, 1934.

TABLE 1.—*Kidney and Bladder Findings*

	Kidney		Bladder
	Right	Left	
Microscopic	Turbid	No urine obtained Pure blood collected	Transvesical clear
Erythrocytes	Numerous		Few
Leukocytes	Occasional		Rare
Casts	None		None
Epithelium	Round and flat		Round and flat
Stained smear	Few gram negative bacilli		Few gram negative bacilli
Culture	Sterile		Sterile
Appearance time of indigo carmin	Three and one-half minutes	None in fifty minutes	
Grams of urea per litre	Four		Three

be considerably dilated. Intravenous urography was performed, and demonstrated immediate function of the right kidney with normal filling of the pelvis, calices and ureter. No excretion of dye appeared from the left kidney.

It was apparent that we were dealing with a pathological lesion almost completely obstructing the lower left ureter, which had caused considerable back pressure above, resulting in hydronephrosis and atrophy of the left kidney. Because of the bizarre pressure defect noted 11 centimeters above the left orifice, on account of the fact that we were unable to pass by an obstruction with various-shaped filiform bougies, and also because of the absence of stone, we assumed that the obstruction was either due to valvular hypertrophy of the ring muscle or to neoplasm of the ureter. As our investigations had clearly demonstrated that the left kidney had been destroyed by back pressure caused by this obstructive lesion, most probably a tumor, it was decided to perform a nephro-ureterectomy.

Operation. — Nephrectomy, June 27, 1933. Under nitrous oxid anesthesia, the usual curvo-linear incision was made on the left side. The kidney was found to be considerably enlarged and consisting of a hydronephrotic sac containing fluid under pressure. The pedicle was first ligated, after which the upper two-thirds of the ureter, including a constricting globular enlargement, was removed. Examination of a frozen section taken from the tumor at this time failed to reveal cancer cells, and we thought that we were dealing with constriction of the lower ureter due to a benign tumor, or to congenital or acquired hypertrophy of the annular smooth muscle fibers—a condition very much like that encountered at the uretero-pelvic juncture. A more detailed pathological examination made later revealed the tumor to be malignant, and containing mitotic figures. It was therefore decided to remove the remaining portion of the lower ureter, lest it should contain cancerous involvement. Two weeks later, July 11, 1933, the lower ureter was removed, through a retroperitoneal incision in the lower abdomen. Considerable peri-ureteritis was encountered, and the ureter was removed at the point where it entered the bladder wall: the intramural portion of the ureter was not removed. Careful examination of extirpated lower ureter revealed no evidence of cancer.

Surgical Specimen.—The specimen consists of an enlarged hydronephrotic left kidney, 9 by 4 by 6 centimeters, and ureter containing a spindle-shaped tumor measuring 2.5 centimeters by 8 millimeters situated 4.5 centimeters below the uretero-pelvic junction. On making frozen sections at the time of operation, the pathologist reported fibrosis and hypertrophy of the ring muscle of the ureter. However, sections made later revealed the true malignant nature of the tumor. The kidney is enlarged and discolored, the structures of the cortex presenting a grayish appearance. Sagittal incision of the kidney reveals considerable narrowing of the parenchyma which presents a pale, waxy appearance and dilatation of the pelvis, the walls of which are very much thickened.

Later sections of the tumor show marked fibrosis of the ureteral wall. The cicatricial tissue separates the muscle bundles, and it contains areas filled with atypical epithelial cells. These cells are directly contiguous with those forming the epithelial lining or mucosa of the ureter, and have a tendency to grow outward in masses infiltrating between the muscle layers, and extending nearly as far as the outer coat or serosa. The lumen is still patent, but is mechanically closed by invasion of tumor cells. A moderate number of mitotic figures are seen throughout the inner layers of the tumor. In the outer layers, the tumor cells do not appear to be as active and are compressed by muscular tissue.

Sections taken from the renal cortex show chronic interstitial nephritis and considerable thickening due to fibrous tissue. Throughout the cortex and medulla many areas of round-cell infiltration are seen. Many of the glomeruli are edematous. The convoluted tubules are dilated and the epithelial lining cells are flattened. These changes are apparently due to back pressure, resulting from obstruction of the ureter due to invasion by carcinoma. No tumor cells were found in any portion of the kidney.

Pathological Diagnosis. — Primary carcinoma of the ureter with occlusion of its lumen; hydronephrotic atrophy of the kidney.

Clinical Course.—Both the lumbar and the abdominal incisions rapidly healed, and the patient left the hospital on July 25, 1933, free of symptoms. He gained thirteen pounds in weight and felt rather well for about two months, at the end of which time he developed frequency, burning urination and mycturia. He reëntered the hospital on October 23, 1933, for reëxamination. Thirty per cent phenolsulphonephthalein was recovered in the urine in two hours after intramuscular injection. Cystoscopic examination revealed a contracted bladder with a capacity of 100 cubic centimeters. In the region of the left orifice, one could see a projecting nodular mass which seemed to push the bladder mucosa forward and which involved the posterior urethra. Rectal examination revealed a large, stony, hard mass above the prostate and the seminal vesicles which encroached upon the sigmoid. It was apparent that the neoplastic process had continued to develop and had involved the bladder wall. On November 14, the phthalein test had di-

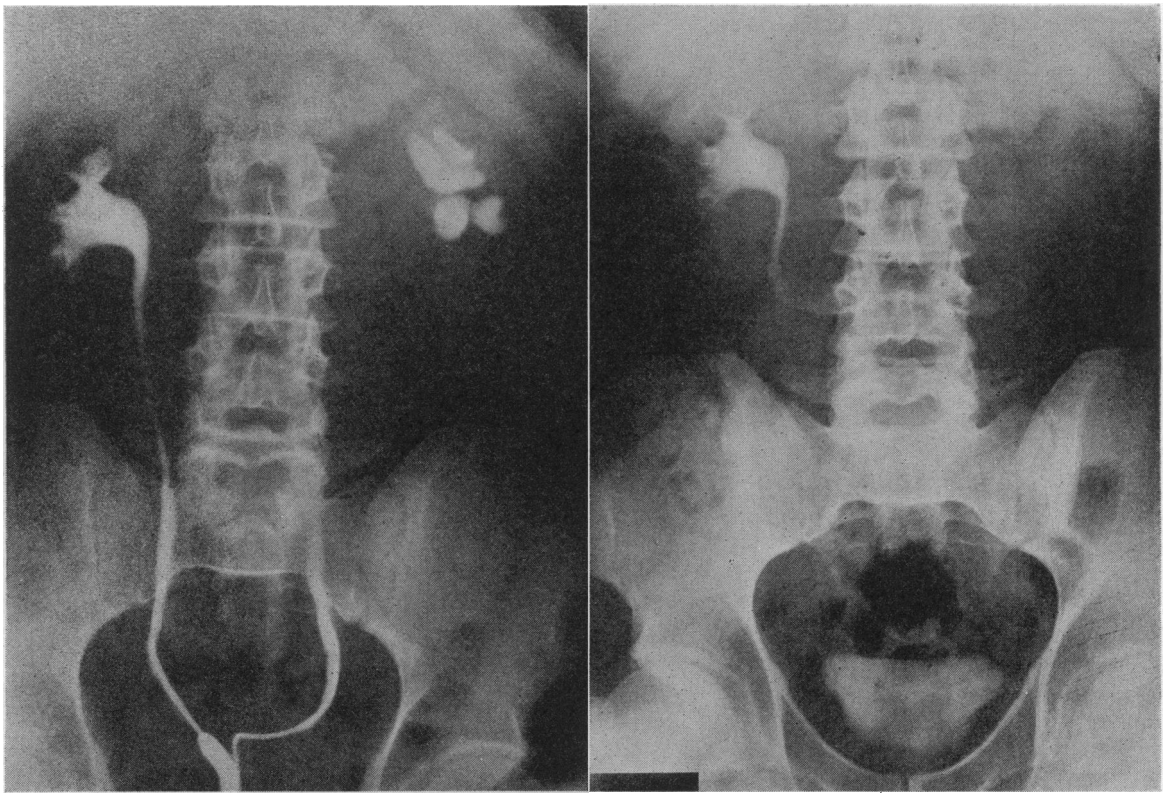

Fig. 1a

Fig. 1b

Fig. 1a.—Retrograde bilateral ureteropyelogram. Note normal filling of left ureter to a point 11 cubic centimeters from orifice at which catheter was obstructed and above which pressure defect is seen. Some of opaque solution has passed by obstructing ureteral carcinoma, filling middle calyx of left kidney, which is considerably dilated.

Fig. 1b.—Intravenous urogram demonstrating normal filling of right kidney pelvis, calices and ureter and no excretion of dye from left kidney.

minished to 5 per cent, and in attempting to perform intravenous pyelography, the right kidney failed to eliminate any of the injected dye. At this time the bladder was reëxamined by cystoscopy. The mass formerly noted in the region of the left ureteral orifice had greatly increased in size so that it now involved about half of the bladder projecting over and obscuring the right orifice. Blood chemistry was performed and the creatinin content was found to be 4.2 milligrams to 100 cubic centimeters. It was apparent that the tumor mass, in involving the bladder wall, had constricted the lower portion of the right ureter, causing back pressure and hydronephrosis. The creatinin content of the blood on November 18 was 4.2 milligrams; on December 2, 8.5 milligrams; on December 6, 8.5 milligrams; and on December 13, 6.5 milligrams to 100 cubic centimeters. Colostomy was proposed to relieve progression bowel obstruction, and ureterostomy into the groin was also suggested as a palliative measure in order to establish urinary drainage and to prevent impending uremia. The patient refused these palliative measures, including radium therapy, gradually lost strength and weight, and died in uremic coma on January 14, 1934.

Necropsy.—January 14, 1934. The patient is greatly emaciated. The abdomen is distended. There are a large number of petechiae over the abdomen and thighs. There is a scar in the left lower abdomen, resulting from a former ureterectomy, and also a nephrectomy scar in the left lumbar region. The peritoneum is filled with clear amber colored fluid. The peritoneum is smooth and the omentum is folded over the stomach. The pelvic cavity is frozen solid with an extensive invading tumor mass. This neoplasm has encroached on the descending colon, which is filled with fecal matter. The ascending colon and the appendix are drawn up into the right upper abdominal quadrant to a position under the liver and gall-bladder. The liver contains numerous hard fibrous neoplastic nodules. There are small miliary nodules in the omentum, mesentery and spleen. The bladder wall is entirely invaded with a neoplastic growth and measures 1.5 centimeter in thickness. The right ureter enters the bladder in the midline, and in attempting to catheterize this tube with a bougie from above downward, an obstruction was encountered in the intramural portion where it traverses the bladder wall. The ureter was then dissected free, as far as the kidney; after which this organ was liberated and removed. The ureter and kidney pelves were considerably dilated and presented a very thin wall. The ureter was constricted at the point where it passed over the pelvic promontory. This constriction of the ureter was due to a tumor mass which had surrounded it and partially closed it off by external pressure. A similar constriction of the intramural portion of the ureter was found to be due to involvement of the bladder wall.

Diagnosis.—Primary carcinoma of the ureter with metastasis into the bladder, liver, omentum and spleen. Hydronephrosis and hydroureter, right.

Microscopic Pathology.—Sections through the bladder wall reveal constriction of the musculature, which is due to the development of fibrous tissue. Between the bundles of muscles one notes extensive infiltration, with groups of small round epithelial cells in almost every portion. These cells are found to be in every portion of the bladder wall extending from the peritoneum to the mucosa. They occupy the small endothelial lined spaces made up of veins and lymph capillaries. Under the peritoneum there are large masses of these cells, some of which have coalesced and invaded the retroperitoneal fat, forming quite an extensive tumor.

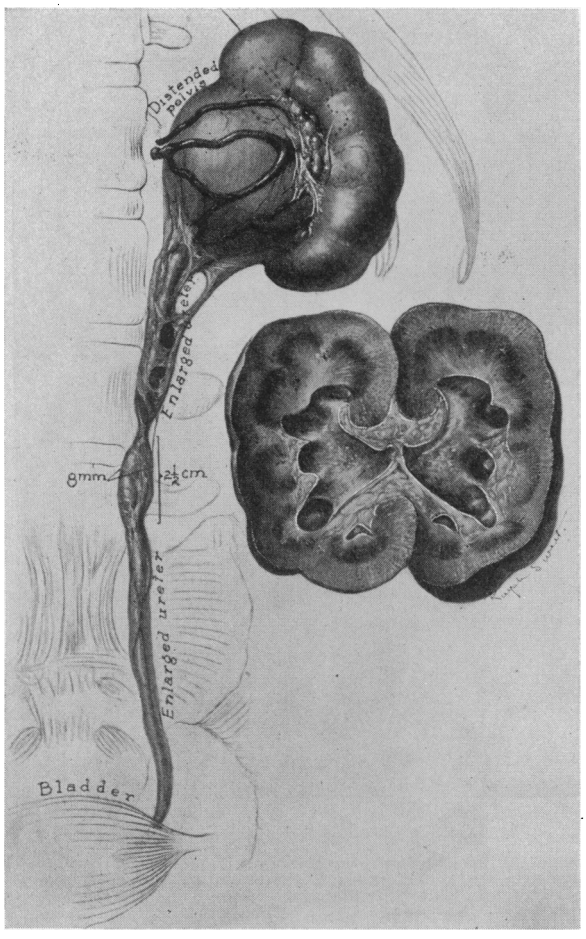

Fig. 2.—Illustration showing carcinoma of ureter and enlarged hydronephrotic kidney above. The extirpated organ presents dilatation of pelvis and narrowing of parenchyma in which there was found advanced cicatricial changes due to nephritis. Kidney and lower ureter not involved by carcinoma.

Section of the liver shows even greater permeability to these tumor cells. There are large masses of infiltrating cells, which have broken through the smallest capillaries. The tumor mass seems to follow the vessels just under the liver capsule, and contains numerous mitotic figures. As many as eighteen or nineteen mitotic figures can be seen in one high dry power field. In the region of the tumor, the liver cells themselves present very marked granular brown atrophy.

Section of the kidney reveals dilatation of the conducting tubules and a moderate amount of cicatricial tissue involving the blood vessels and glomeruli. There are a few areas which show round-cell infiltration, and these are more marked in the region of the cortex. A number of the glomeruli and convoluted tubules present marked edema. Few of the tubules show casts. No tumor cells are observed in the sections obtained from the kidney.

Final Diagnosis.—Primary carcinoma of ureter for which operation was performed; with metastases in the bladder, peritoneum, mesentery, and liver. Hydronephrotic atrophy of opposite kidney (right) due to partial obstruction of lower ureter.

SYMPTOMATOLOGY

The symptoms due to carcinoma of the ureter simulate those of other obstructive lesions of the ureter or neoplasms of the kidney. Although its diagnosis is obscure, certain symptoms should lead

Fig. 3.—Microphotograph of transverse section through involved ureter showing carcinomatous infiltration of ureteral wall with extension into its lumen, producing almost complete mechanical obstruction.

one to suspect the possibility of this condition. These are hematuria, pain and tumefaction of the kidney, accompanied by the general symptoms of cancer, consisting of loss of weight, anorexia, debility, and cachexia. Hematuria is a symptom of tumor of the prostate gland, bladder, ureter, or kidney. Cystoscopic examination of the bladder will soon rule out tumor of this viscus, and that of the prostate gland and ureteral catheterization will demonstrate if the blood is coming from a certain portion of this tube rather than from the kidney above. Hematuria may be abundant, spontaneous or intermittent, and is often accompanied by the emission of clots. In certain cases, like in our own, hematuria is very slight and can only be determined by making a microscopical examination of the urine. The formation of a tumor in the ureter, which consists of a narrow tube, rapidly forms an obstruction to the outflow of urine, causing back pressure, which soon results in hydroureter and hydronephrosis. This leads to tumefaction of the kidney, which is detectable by palpation or by roentgenological examination of this organ. The obstructing tumor soon gives rise to pain, which occurs as intermittent attacks of renal crisis, or is of the dull lumbar or upper abdominal type. A number of accessory symptoms such as frequency, urgency, pain in the bladder, etc., sometimes occur. When the triad of symptoms, consisting of hematuria, pain, and tumefaction of the kidney, occur, accompanied by loss of weight, debility and cachexia, one should bear cancer of the ureter in mind as well as renal tumor.

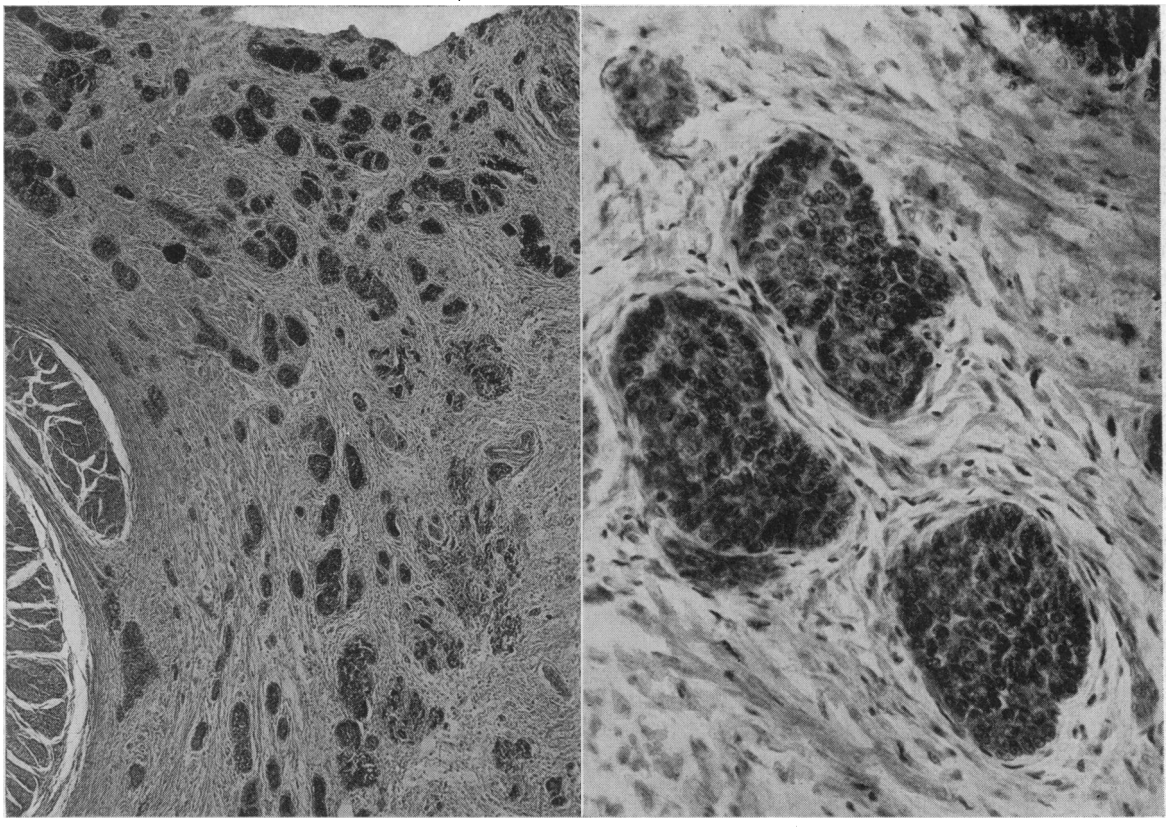

Fig. 4a

Fig. 4b

Fig. 4a.—Microphotograph of bladder wall involved by metastasis, showing fibrosis and invasion by groups of cells between muscle bundles.

Fig. 4b.—Microscopical appearance of these groups of actively growing epithelial cells containing mitotic figures. Similar cells were found in the original tumor, and other metastasis in the peritoneum, mesentery and liver.

DIAGNOSIS

The diagnosis of carcinoma of the ureter is obscure, yet certain positive signs will aid one to detect this rare condition. In making a cystoscopic study of the affected side from which bleeding is observed, one is often unable to pass the catheter beyond the obstructing tumor. Repeated attempts are often unsuccessful. In moving and twisting the catheter in order to attempt to pass by, non-peristaltic free bleeding results. This is detected by observing the ureteral orifice, and is different from that caused in patients presenting stone and stricture formation of the ureter in which bleeding, when produced, is usually peristaltic in nature. If one is able to pass by the obstructing tumor, this bleeding ceases and clear urine may be obtained. Differentiation of ureteral tumor from the non-opaque uric acid calculus is quite difficult. The recovery of uric acid crystals from the urine of the involved ureter is of great assistance, and is pathognomonic of uric acid calculus. In some cases the tumor cells can be recovered from the urine. One should also suspect ureteral tumor in cases in which hematuria is found to come from a ureter that has been left behind after nephrectomy for hydronephrosis. Such a case was recently reported by Davis and Sachs.[6] Another was observed by my associate, Dr. George Oviedo, in which the hydronephrotic kidney, however, also contained cancerous involvement. Cystoscopy sometimes shows projection of the tumor from the ureteral orifice or an implantation tumor in the mucosa close by. Careful observation of the orifice will show modification of the ureteral spurt, and the orifice itself is in some cases dilated. In patients presenting tumor of the lower ureter, it can sometimes be palpated by way of the vagina or rectum. Urography is of great aid. When one is able to pass the catheter by the obstructing tumor, a filling defect in the lumen of this tube is encountered, above which the ureter and kidney pelvis is dilated. In some, the ureter has a moth-eaten appearance, very much like that produced by tuberculosis. In those patients in whom one is unable to pass the catheter by the obstructing tumor, intravenous urography will demonstrate the filling defect and hydronephrosis. Unfortunately, as in our own case, renal function is reduced to such a degree that the dye is not secreted by the weakened organ, and no outline of the ureter or kidney is securable. In a suspected case of carcinoma of the ureter, the salient physical signs are: the presence of a tumor growth projecting from the ureteral orifice or in the adjacent mucosa, an impassable obstruction in the ureter, modification of the ureteral spurt, non-peristaltic hematuria resulting from attempts to pass by with a catheter, and a urographic filling defect of the

ureter with hydroureter and hydronephrosis above the point of pressure.

TREATMENT

Although in a very few selected cases of primary carcinoma of the lower-most portion of the ureter it might be possible to remove the involved ureter transvesically and perform ureterocystoneostomy, complete nephro-ureterectomy in one sitting, including removal of the intramural portion of the ureter, is the most rational procedure and has given the best results. Crance and Knickerbocker [7] report an eight-year cure, and Kraft an eleven-year cure by this complete operation. Partial resection of the ureter, including the tumor, accompanied by ureterostomy, had been performed mostly on advanced cases, and these patients later died from metastasis. Nephrectomy followed by ureterectomy is a common procedure. We utilized this method in our own case because, at the time of the first intervention, a frozen section of the tumor failed to reveal malignancy, and ureterectomy was performed at a later date in order to assure removal of cancerous involvement that might have been present in the lower ureter. Had we known that we were dealing with a malignant growth, complete nephro-ureterectomy in one sitting would have been performed. In performing nephro-ureterectomy, the kidney is removed through the usual lumbar incision, and the lower ureter through the customary retroperitoneal incision of the lower abdomen after the method of Gutierrez.[8] Complete nephro-ureterectomy in one sitting should be the treatment of choice. as the entire upper urinary tract is removed on one side, assuring eradication of any cancerous cells that might have been implanted lower down in the mucosa of the ureter. In cases in which the diagnosis of carcinoma of the ureter is strongly suspected, but cannot be definitely proved, exploratory operation is justified.

COMMENT

In our case of primary carcinoma of the ureter, neoplastic involvement was diagnosed prior to surgical intervention. Frozen sections made at the time of operation failed to demonstrate malignant properties, and we then thought that we were dealing with annular hypertrophy of the ring muscle of the ureter or a benign tumor. For this reason, at the time of the nephrectomy, we were content to remove the upper ureter containing the tumor and the kidney destroyed by hydronephrosis. When, on further study, the malignant nature of the tumor had been established, the lower ureter was removed later and the patient died from metastasis. It is probable that the blood stream and lymph channels had already been invaded by cancerous cells at the time of the first intervention, as an extensive fibrous reaction was noted to exist in the tissues surrounding the tumor, and also in those surrounding the lower ureter. It is possible that, at this time, metastasis had not taken place, and recurrence was due to the growth of implantation cells in the intramural portion of the ureter which had not been removed. In retrospection of this case, the following deductions can be made:

1. Early diagnosis of primary carcinoma of the ureter is a well worthwhile objective, as it offers the only chance of cure by early surgical removal.

2. One should bear in mind the possibility of primary cancer of the ureter in patients presenting the general symptoms of cancer, and who present the triad of symptoms, consisting of hematuria, lumbar pain and tumefaction of the kidney, in whom ureteral obstruction is encountered, and in whom one can reasonably rule out stone, ureteral stricture and tumor of the kidney.

3. Salient points in establishing a positive diagnosis are: the presence of a tumor growth projecting from the ureteral orifice or in the adjacent mucosa, an impassable obstruction in the ureter, modification of the ureteral spurt, non-peristaltic hematuria resulting from attempts to pass by with a catheter, and a filling urographic defect of the ureter, with hydroureter and hydronephrosis above the point of pressure.

4. The treatment of choice that is most likely to give lasting results is complete nephro-ureterectomy, when feasible, including removal of the intramural portion of the ureter in one sitting.

We wish to express our thanks to Dr. Elmer Smith, pathologist of St. Mary's Hospital, for the pathological studies carried out in this case.

450 Sutter Street.

REFERENCES*

1. Player, L.: Primary Ureteral Carcinoma with Case Report and a Review of the Literature, Urol. and Cutan. Rev., 25:438, 1928.

2. Stampinato, C.: Tumori primitivi dell'uretere, Arch. Ital. di Urol., 9:347, 1932.

3. Snyder, W. H., and Wood, B. S.: Primary Carcinoma of the Ureter with Report of Case, J. Urol., 29:577, 1933.

4. Scott, W. W.: Primary Carcinoma of Ureter, Surg. Gynec. and Obst., 58:215, 1934.

5. Chauvin, E., and Cerati: Les Tumeurs Epithéliales de l'Uretère, Arch. d. Mal. d. Reins, 5:631, 1930-1931.

6. Davis, E., and Sachs, A.: Primary Epithelioma of the Ureter, J. A. M. A., 96:2096, 1931.

7. Crance, A., and Knickerbocker, H. J.: Postoperative Results in Primary Carcinoma of the Ureter Following Complete Nephro-ureterectomy, J. Urol., 17:157, 1927.

8. Gutierrez, R.: Indications and Technique of Combined Ureteronephrectomy, Ann. Surg., Vol. 93, 1931.

DISCUSSION

PAUL A. FERRIER, M.D. (65 North Madison Avenue, Pasadena).—We are indebted to Doctor Mathé for this detailed report of a condition very difficult to diagnose. As happens sometimes in relatively rare conditions, such carcinomas come in groups. Dr. A. G. Foord, pathologist of the Pasadena Hospital, has had three of these at autopsy during the past year. The patients had not been in the hands of urologists and they had been said to have ovarian tumors. Two were squamous and one was papillary. In the latter

* Contains important recent references and cases reported in 1932, 1933 and 1934. For former references consult articles by Snyder and Wood and by Chauvin and Cerati.

case the kidney was gone over very thoroughly, and no evidence of papillary growth was found in the kidney itself.

During the same year I had a case personally of primary carcinoma of the ureter, in which the diagnostic findings were not very unlike Doctor Mathé's, except that it was not possible to force any opaque fluid past the growth. On intravenous injection of neo-iopax, no dye whatever was secreted by the blocked kidney. An unusual feature was that bleeding continued long after the ureteral block was complete, and this came from ulcerated varicosities in the submucosal veins of the ureter for a distance of about seven centimeters below the tumor. X-rays of the pelvis and chest were negative. The diagnosis of ureteral tumor was made in this case, and the kidney and entire ureter were removed at one time. The tumor had adhered to the common iliac vessels. No para-aortic glands were palpable.

Pathological examination showed a ring tumor completely occluding the ureter at the brim of the pelvis, well away from the bladder. The kidney was hydronephrotic and atrophied. It had no tumor. The microscopic diagnosis was that of Doctor Mathé's case, namely, squamous-celled carcinoma primary in the ureter.

The patient is in good condition seven months after operation.

❋

J. C. Negley, M.D. (527 West Seventh Street, Los Angeles).—Doctor Mathé's presentation of this rather unusual case demonstrates advances made in, and the exactness of diagnostic urology.

In the past six years the patient has had several attacks of left lumbar pains which radiated to anterior left lower abdomen, lasting a few days. Probably the original lesion began then with subsequent stricture of ureter from calculus, inflammatory process localized in ureter or surrounding tissues, with subsequent malignant growth in this area, as malignancy forms on gastric ulcer, rectal lesions, etc.

Malignancy was early and preceded by a long period by other pathology as evidenced by the facts that (*a*) a frozen section failed to demonstrate malignancy, and (*b*) the predominating findings in surgical specimens, frozen sections, regular sections were fibrosis, hypertrophy and scar tissue. If the patient had been cystoscoped and carefully studied any time between his initial attack and the first disabling attack, ordinary cystoscopic treatment might have saved the kidney, or early nephro-ureterectomy would surely have prevented the malignancy.

Autopsy findings and early signs of metastasis indicate that at operation lymph channels had indiscernible invasion (evidenced by extension down descending colon to left side of bladder, the entire bladder and pelvis). Liver involvement indicates a blood invasion, either then or later.

I am in entire accord with all points made by the author, and would emphasize the following:

1. Diagnosis of primary malignancy of the ureter is possible in the majority of cases.

2. Intravenous urography is sadly lacking in exactness of diagnosis, as compared with retrograde urography.

3. Frozen sections, even those made by the most competent pathologists, are often misleading and of undeniable value only when positive.

4. Exactness of diagnosis in urology is unexcelled by any other branch of medicine. However, laity and the profession at large do not always make early or good use of available diagnostic procedures.

5. Doctor Mathé is to be commended for his excellent care of this patient, and surely deserved a more fortunate end-result.

SPINAL CORD INJURIES—THEIR TREATMENT*

By Howard W. Fleming, M. D.
San Francisco

Discussion *by Frederick Leet Reichert, M.D., San Francisco; Edmund J. Morrissey, M.D., San Francisco; Mark Albert Glaser, M.D., Los Angeles.*

ONE of the most difficult problems confronting the surgeon is the care of injuries of the spinal cord. Nor is agreement as to management and treatment to be found in the literature. In view of this situation, a consideration of some of the fundamental facts in relation to trauma of the cord may be of value.

EMERGENCY CARE OF SPINAL-CORD INJURIES

The emergency care of patients with injuries to the spinal cord is extremely important. Neglect, delay or improper treatment will often give rise to complications that materially influence the prognosis as to recovery, the comfort of the patient, and the difficulties and cost of subsequent care.

The original examination and transportation of the patient require care. Rough or careless handling may alter the damage to the cord from a minor to a major contusion. The patient should be placed on an air mattress as soon as possible, for undue pressure on an anesthetic area may devitalize tissue within a few hours. The resultant pressure sore will require months of careful nursing.

SHOCK

It is necessary only to mention that serious shock, if present, is our first consideration. Elaborate methods of diagnosis and treatment must be delayed until the patient's condition warrants their use. Occasionally, associated intra-abdominal injuries, or those of the chest, are not recognized in the presence of serious damage to the spinal cord. More frequently, severe injury to the cord is not appreciated if the patient has an associated injury of the head. The combination of injury to the head and cervical cord is fairly frequent, and must be borne in mind.

CARE OF THE BLADDER

Care of the bladder is an important consideration. There is usually a retention of urine, and all too often the patient is catheterized early. Infection results, and frequent or continuous drainage becomes necessary. Urinary infection is a common cause of death in patients with paraplegia. Often catheterization can be avoided entirely by allowing the bladder to overflow. Several of our patients never have been catheterized, and have had no complications arising from urinary infection. The bladder may reach an alarming size, and it is difficult to resist the urgent demands of the patient, intern, and nurse to empty it. Usu-

* From the Department of Surgery, Division of Neurosurgery, University of California Medical School.

Read before the General Surgery Section of the California Medical Association at the sixty-third annual session, Riverside, April 30 to May 3, 1934.